Planning

Basic Strategic Planning From California Department of Finance

Strategic planning asks and answers four basic questions. The process of addressing these questions produces responses which become the Strategic Plan. The components of a recommended strategic planning process that correspond with these questions are as follows:

Where Are We Now?

Before an agency can develop a plan for a change, it must first determine where it currently stands and what opportunities for change exist. Strategic planning is supported by:

External/Internal Assessment

An analysis and evaluation of key internal and key external data and factors that influence the success of an agency in achieving its mission and goals. Two components of this assessment are:

Situation Inventory

An assessment of an agency's position, performance, problems, and potential; in other words, its strengths and weaknesses.

Environmental Scan

An analysis of key external elements or forces, including the stakeholder analysis, that affect the environment in which an agency functions. This is commonly referred to as the opportunities of and threats to the agency. In developing a strategic plan, an agency should consult with the Legislature and solicit and consider the views and suggestions of entities, such as customers and other stakeholders, potentially affected by or interested in the plan.

Mission

The agency's unique reason for existence; the overarching goal for the agency's existence, usually contained within a formal statement of purpose. In addition, mission statements can be developed at the program and subprogram level.

Principles

The agency's core values and philosophies describing how the agency conducts itself in carrying out its mission.

Where Do We Want to Be?

Strategic planning identifies:

Vision

A compelling, conceptual, vivid image of the desired future.

Goals

The desired end result, generally after three or more years.

Objectives

Specific and measurable targets for accomplishment of a goal.

How Do We Get There?

Strategic planning develops:

Action Plan

A detailed description of the key strategies used to implement each objective.

How Do We Measure Our Progress?

Strategic planning builds in:

Performance Measures

The methods used to measure results and ensure accountability.

Monitoring and Tracking Systems

The systems to monitor progress, compile management information and keep the plan on track.
Finally, strategic planning guides:

Resource Allocation

The determination and allotment of assets or resources, including those for capital outlay, necessary to carry out strategies and achieve objectives, within a priority framework.

Customer and Stake Holders Survey for Water Plan Update 2003

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001

We need your input. The Department of Water Resources (DWR) is now preparing the *California Water Plan - Update 2003* for release at the end of 2003. We are committed to a collaborative, stakeholder-driven approach for preparing *Update 2003*, with broad public participation. That is where you fit in. We want to know how we can make the Water Plan more useful to you. That is why we developed an Internet survey for customers and stakeholders of *Update 2003*.

State law requires DWR to update *the California Water Plan*, also known as Bulletin 160, every five years. *The California Water* Plan is many things to many people. It provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan presents basic information on California's water resources, including water supply evaluations and assessments of agricultural, urban, and environmental water uses. The Plan quantifies the reliability of water supplies to its various uses. It also identifies and evaluates existing and proposed statewide demand management and supply augmentation programs and projects to address the State's future water needs.

The survey takes only about 10 minutes to complete. To take the survey, just click on: www.tec-web.com/cawaterplansurvey/Login.asp

When it asks for your username enter your first and last name, and for the password enter "*cawater01*".

Thank you in advance for helping make *Update 2003* a more useful resource.

Sincerely,

Jonas Minton, Deputy Director
California Department of Water Resources

Customer Survey

See the previous page to read the letter from DWR's Deputy Director, Jonas Minton, inviting you to take the survey.

What is the purpose of the survey?

The purpose is three-fold:

- Marketing - to increase awareness and acceptance (e.g., expanding our user base, increasing credibility through stakeholder buy-in)
- User Needs Assessment - to answer, "How can the Water Plan best assist existing and potential Water Plan users with their missions?"
- Evaluation – to answer, "What can we do better and how?"
- What is the main question we are trying to answer?

How can we make the Plan more widely read, understood and useful?

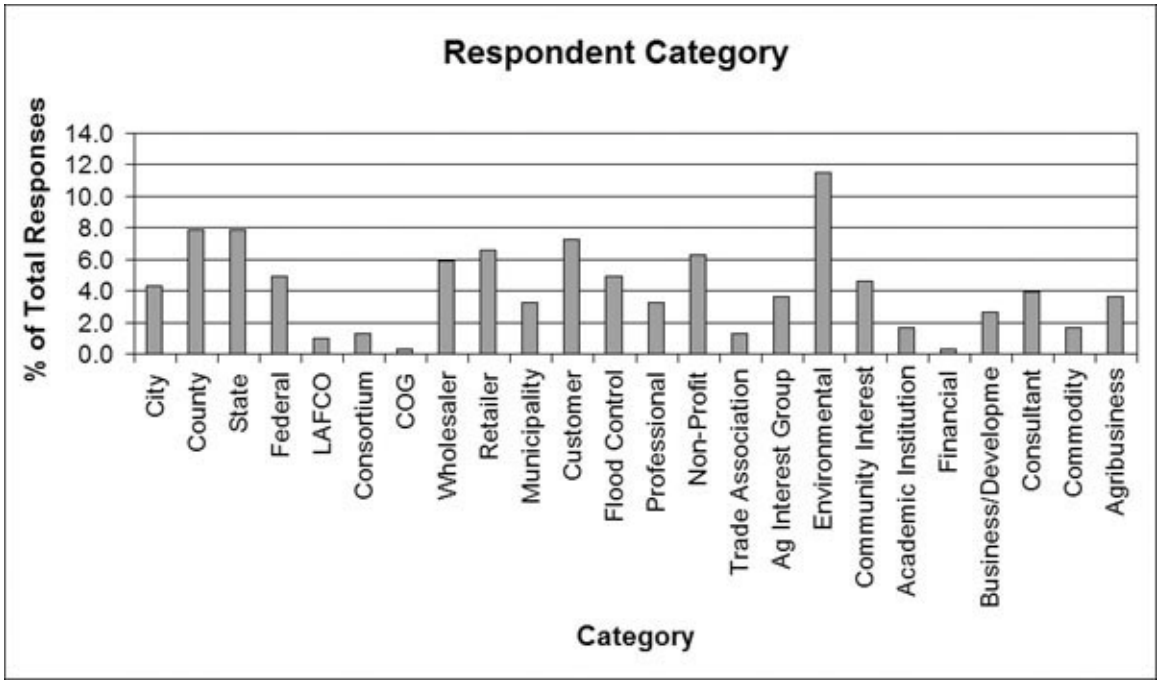
Who is the target audience?

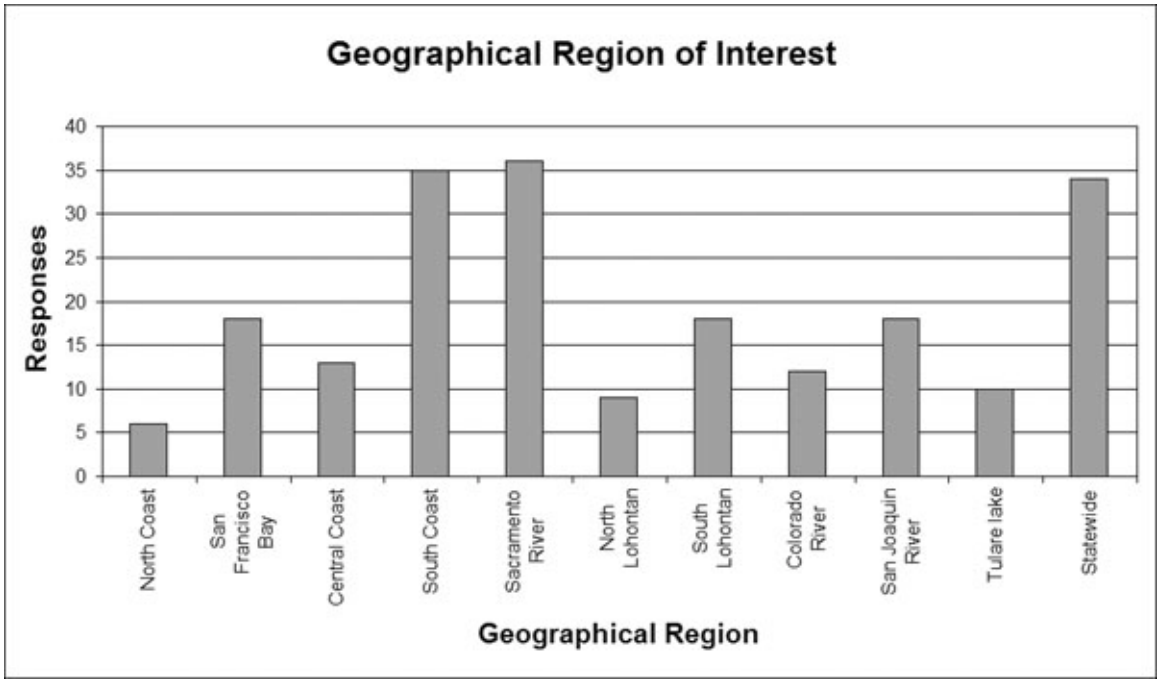
The target audience is very diverse as we are trying to reach existing as well as potential new users. This expands the audience of government, private and non-profit entities to include land use planners, natural resources planners, environmental and social advocacy groups, business sectors (e.g., agricultural, real estate, financing), professional associations, academic institutions, water planners, wholesalers and retailers, and similar individuals and groups.

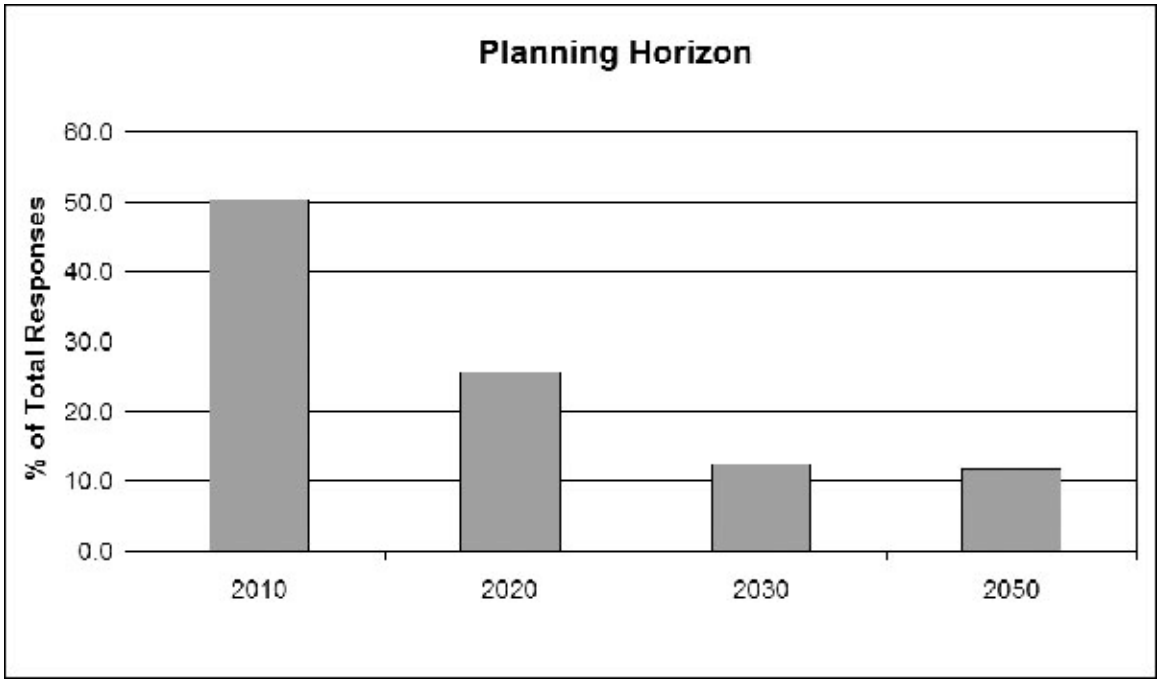
How will we use the information?

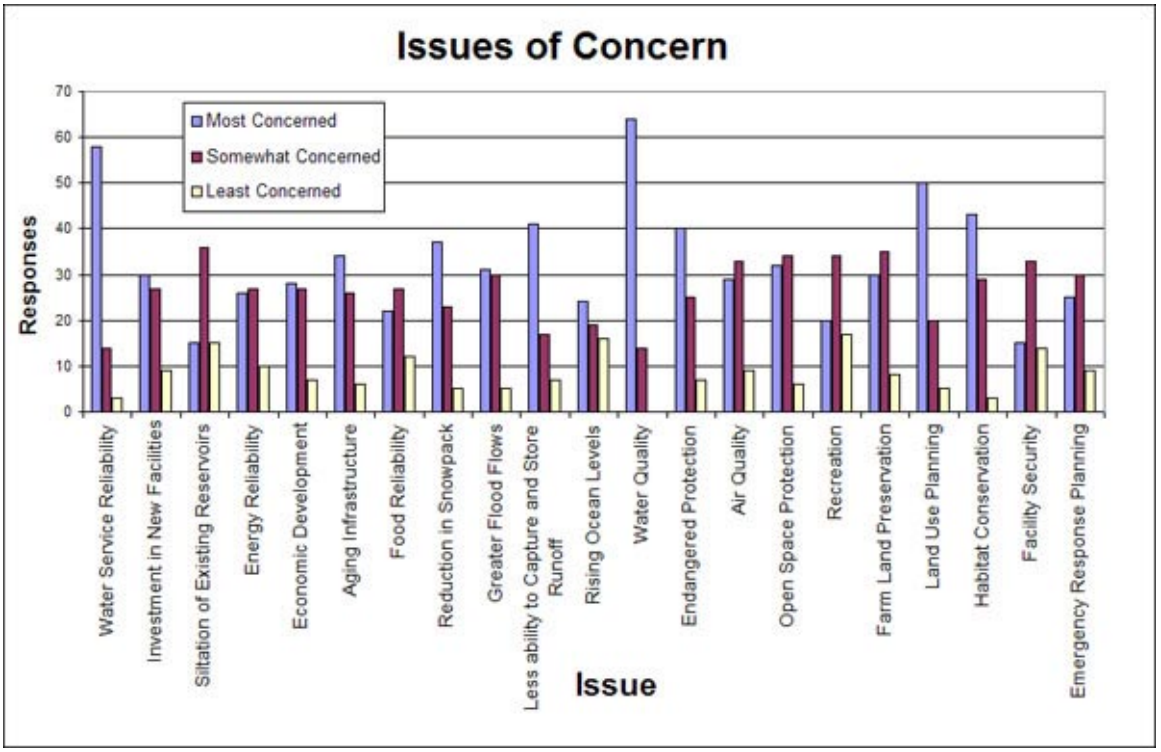
Two key deliverables resulting from this survey will be: (1) a summary of user suggestions; and (2) correlations intended to tell us which elements of the plan are most and least used/useful and to whom. We will capture all of these suggestions and correlations and share them with the public Advisory Committee for Update 2003. Based on their input and DWR resources, suggestions and insights will either be incorporated into Update 2003 or will be available for use by the Update 2008 team.

Customer Survey Graphical Results






Planning Horizon
% of Total Responses
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2010
2020
2030
2050


Issues of Concern
Most Concerned
Somewhat Concerned
Least Concerned
Responses
70
60
50
40
30
20
10
0
Water Service Reliability
Investment in New Facilities
Siltation of Existing Reservoirs
Energy Reliability
Economic Development
Aging Infrastructure
Food Reliability
Reduction in Snowpack
Greater Flood Flows
Less ability to Capture and Store Runoff
Rising Ocean Levels
Water Quality
Endangered Protection
Air Quality
Open Space Protection
Recreation
Farm Land Preservation
Land Use Planning
Habitat Conservation
Facility Security
Emergency Response Planning
Issue

Future Scenarios and Responses

Introduction

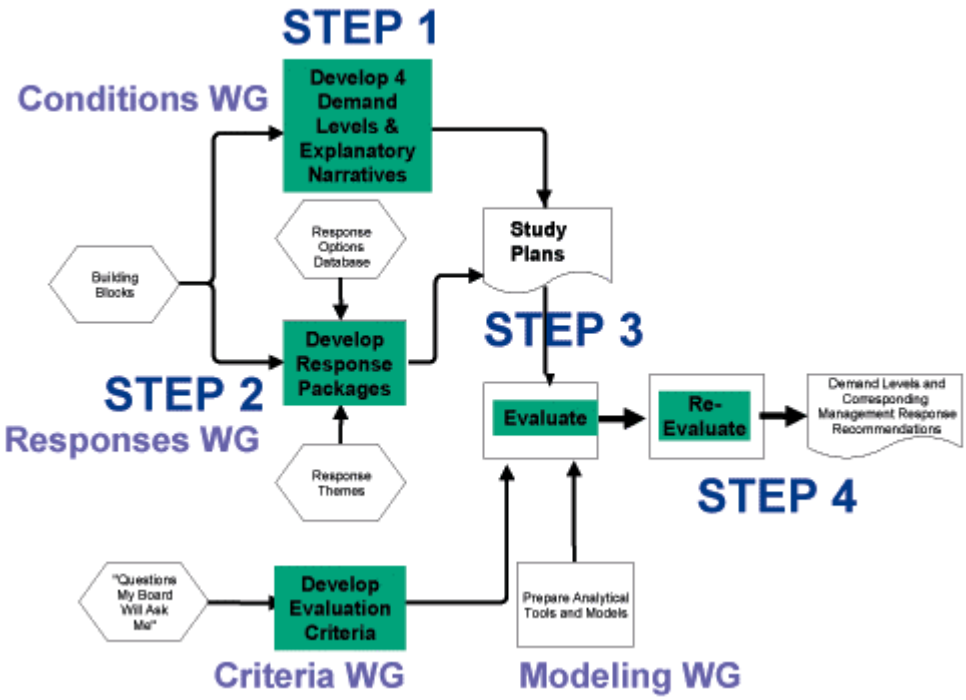
The concept of scenario planning is like a decision tree analysis that outlines different actions or responses based on different plausible futures. Some actions would be common and implemented regardless of the scenario, others actions will be taken in response to specific conditions. Scenarios are neither positive nor negative.

These plausible "futures" are differentiated by important assumptions about uncertainties in water resource conditions that could significantly affect responses or actions taken to control the vulnerability to the assumption, such as using no or low regret strategies, or to better prepare for changes in future conditions, such as taking actions that would respond to incorrect assumptions about future water needs or future changes in climate.

The development of different response packages may tend to favor or shape actions toward a desirable future condition within a plausible future scenario. It is in this area of no-regret actions where stakeholders can identify areas of agreement and where short-term measures can be implemented. In the long-term time frame, where uncertainties about future assumptions increase, it is important to monitor and plan for the likelihood that in the event future conditions are worse than assumed, there is sufficient time to plan and implement adequate response measures for the changed conditions.

An important element of scenario planning for the Water Plan is that as the State continues to grow, the updates of the Water Plan will need to re-evaluate strategies based on revised plausible futures that incorporate increased certainty about future conditions or changes in water policies.

The steps in the planning process for the update of the Water Plan can be summarized in the following flow diagram:



Update 2003 considers resource management strategies (discussed in Chapter 5) to study in conjunction with the four plausible future scenarios. A group of strategies could be implemented together or "packaged" to manage possible future conditions. The effectiveness of the strategies and packages could be evaluated for each of the four scenarios using a comprehensive list of evaluation criteria comprising the three "E's": economics, environment and equity and institutional flexibility and technical feasibility.

Study Plan Evaluation Process (Phases 2 & 3)

Step 1 - Develop Demand Levels from Future Scenarios
- Develop Use Levels
- Derive Demand Curves

Step 2 - Develop Detailed Response Packages
- Economic Efficiency and Other Criterion
- Themed Packages (from Mgmt. Responses Work Group)

Step 3 - Evaluate Response Performance
- Data and Analytical Tools
- Economic Criteria:
  Demand Reduction Cost
  Supply Augmentation Cost
  Cost of Forgone Use
- Other Criteria (from Criteria Work Group)

Step 4 - Re-Evaluate Response Packages to Improve Performance by way of Evaluation Criteria

This qualitative analysis would inform the quantitative work in Phases 2 (year 2004) and Phase 3 (year 2005) of the Water Plan. However, these strategies and response packages do not define the Water Plan's quantitative effort. The purpose of developing the scenarios and crafting responses is to think creatively about how to apply the Water Plan's tool kit, represented in Chapter 5's strategy descriptions given the recommendations for reducing uncertainties (Chapter 3) and integrated resource planning (Chapter 4).

Proposed RAND Contribution to the 2003 California State Water Plan

Developing scenarios is a good way to recognize how uncertainties may impact the future and to begin devising policies that will perform well under several different futures. The approach of evaluating several scenarios and planning accordingly, however, may still leave California vulnerable to surprise. Given the large number of uncertain factors driving the future, no small set of scenarios could possibly span the entire range of plausible futures. Furthermore, scenario evaluation alone will not be able to rank policies for decision makers or resolve the numerous conflicting concerns and desires of various stakeholder groups.

Robust decisionmaking methods are available to complement scenario analysis and identify policy strategies that are truly robust – those that will perform reasonably well over a very wide range of plausible futures. These methods also are designed to foster collaboration and consensus, features that will prove critical to California water resource planning. The performance of policies can be evaluated across multiple dimensions such as cost, environmental impact, and water delivery reliability. Additionally, robust solutions are often adaptive and change over time. Techniques for robust decisionmaking have been developed over the past decade and are now being actively applied to other difficult long-term problems such as global sustainability, science and technology planning , military procurement , and long-range financial planning for the California public university systems . DWR will be evaluating these techniques in conjunction with other modeling approaches during Phases 2 and 3 to improve the ability to devise appropriate policies that will be successful under any plausible future.

Future Scenarios

DWR and the Advisory Committee developed three scenarios of plausible events that could shape future water use by 2030. The scenarios describe the plausible conditions that *could happen*. The scenarios concentrate on statewide implications of regional shifts. The compliment to the scenarios is response packages. The responses describe what options could be taken to manage these possible future conditions. The effectiveness of response packages can be evaluated for each scenario using the comprehensive evaluation criteria.

Peter Schwartz, a pioneer in the field of scenario planning, explains:

> In a scenario process, managers invent and then consider, in depth, several varied stories of equally plausible futures. The stories are carefully researched, full of relevant detail, oriented toward real-life decisions, and designed (one hopes) to bring forward surprises and unexpected leaps of understanding. Together, the scenarios comprise a tool for ordering one's perceptions. The point is not to "pick one preferred future," and hope for it to come to pass. Nor is the point to find the most probably future and adapt to it or "bet the company" on it. Rather, the point is to make strategic decisions that will be sound for all plausible futures. No matter what future takes place, you are much more likely to be ready for it—and influential in it—if you have thought seriously about scenarios.[1]

A scenario-building process for comprehensive plan-making can identify plausible futures for a range of uncertainties. Packages of management strategies (from Volume 3) can be tested over the plausible futures to measure their effectiveness in reaching desired futures or outcomes and identifying no-regrets strategies. Scenarios for the Water Plan include:

[1] Schwartz, Peter, *The Art of the Long View,* Currency, 1991. p. xiiv-xiv

- Scenario 1—Current Trends: Continue with no big surprises.
- Scenario 2—Resource Sustainability: California is more efficient in 2030 water use than today while growing its economy and restoring its environment.
- Scenario 3—Resource Intensive: California is highly productive, respectful of the environment, yet less efficient in 2030 water use than today.

Key Factors

DWR have defined these factors as key drivers affecting water management as part of a larger list of factors and is shown in the following Table. This table was used as a stepping stone in developing the narratives for the scenarios. The Advisory Committee recommended that the scenarios highlight the following key factors due to their strategic role in affecting water use, supply, and management. Although some estimated ranges are presented for these factors, the discussion is meant to be largely qualitative.

Total Population: The statewide total population projection regardless of geographical distribution

Population Density: The average number of people per square mile for a planning area.

Per Capita Income: The average annual income from all sources per person for a planning area.

Total Commercial Activity: The amount of commercial activity (e.g. employment, productivity, commercial land use, etc) that occurs in a given study area. This factor is a driver of (and indicator for) commercial water use and includes institutional water use (government offices, schools, etc).

Commercial Activity Mix: The mix of high and low water using commercial activity. Note that Commercial Activity is broken into two factors: Total Activity and Activity Mix. The latter factor allows designation of the type of commercial activity that is occurring.

Total Industrial Activity: The total amount of industrial activity (e.g. employment, productivity, industrial land use, etc) that occurs in a given study area. This factor is a driver of (and indicator for) industrial water use.

Industrial Activity Mix: The mix of high and low water using industrial activity. Note that Industrial Activity is broken into two factors: Total Industrial Activity and Industrial Activity Mix. The latter factor allows designation of the type of industry that is occurring. This is necessary to account for the large variation in water demands by industry type.

Irrigated Land Area: The land area under irrigation in a study area.

Crop Acreage: The number of irrigated crop acres (by crop category) planted in a study area during a given year; this number includes multiple cropping.

Crop Unit Water Use: Changes in the volume of water used per acre of cropped area due to changes in crop type. This can be a function of evapotranspiration rates and cultural practices, but NOT use efficiency. Ag use efficiency is captured under its own distinct factor.

Environmental Water Flow: Water flowing to the environment is not an indicator of environmental conditions. **Flow Based:** The amount of water dedicated to in stream uses and aquatic habitat. Flow based is estimated by (a) Delta outflow, (b) in stream flow requirements, (c) Wild and Scenic River flows (d) Environmental Water Account asset allocations, (e) Anadromous Fish Restoration Program flows, and (f) Ecosystem Restoration Program flow targets**. Land Based:** The amount of water used by managed wetlands and native vegetation. The amount should be estimated by the amount of water used by managed wetlands and native vegetation including riparian water use, however, native vegetation water use is not quantifiable at this time.

Naturally Occurring Conservation: The amount of background conservation occurring independent of the BMP and EWMP programs.

Each scenario aims to represent a plausible 2030. This scenario will be paired with one or more response packages, which describe actions that could be implemented to manage these possible future conditions. The effectiveness of each response package paired with the scenario can be evaluated using the evaluation criteria to look at the effects on the environmental, economics, and equity issues.

Factors Affecting Regional and Statewide Water Use and Supplies[1]
Four Possible Future Scenarios for 2030

FACTOR	SCENARIO 1 CURRENT TRENDS LOW	SCENARIO 2 CURRENT TRENDS HIGH	SCENARIO 3 HIGH URBAN PRODUCTIVITY, HEALTHY AG SECTOR, HIGH ENVIRONMENTAL PROTECTION, LOWER WATER USE AND HIGH EFFICIENCY	SCENARIO 4 HIGH URBAN PRODUCTIVITY, HEALTHY AG SECTOR, HIGH ENVIRONMENTAL PROTECTION, HIGHER WATER USE AND LOWER EFFICIENCY
Total Population	DOF	DOF	DOF	Higher than DOF
Population Density	DOF	DOF	Higher than DOF	Lower than DOF
Population Distribution	DOF	DOF	DOF	Higher Inland & Southern; Lower Coastal & Northern
Commercial Activity	Current Trend—Low range	Current Trend—High Range	Increase in Trend	Increase in Trend (Same as Scenario 3)
Commercial Activity Mix	Current Trend—Low range	Current Trend—High Range	Decrease in High Water Using Activities	Increase in High Water Using Activities
Total Industrial Activity	Current Trend—Low range	Current Trend—High Range	Increase in Trend	Increase in Trend (Same as Scenario 3)
Industrial Activity Mix	Current Trend—Low range	Current Trend—High Range	Decrease in High Water Using Activities	Increase in High Water Using Industries
Total Crop Area (Includes Multiple Cropping)	Current Trend—Low range	Current Trend—High Range	Level Out at Current Crop Area	Level Out at Current Crop Area
Crop Unit Water Use	Current Trend—Low range	Current Trend—High Range	Decrease in Crop Unit Water Use	Increase in Crop Unit Water Use
Environmental Water-Flow Based	Current Trend - Low Objectives	Current Trend - High Objectives	High Environmental Protection	High Environmental Protection
Environmental Water-Land Based	Current Trend - Low Objectives	Current Trend - High Objectives	High Environmental Protection	High Environmental Protection
Naturally Occurring Conservation[2]	NOC Trend in MOUs	NOC Trend in MOUs	Higher than NOC Trend in MOUs	Lower Than NOC Trend in MOUs
Urban Water Use Efficiency	All Cost Effective BMP's in Existing MOU's Implemented by Current Signatories (present commitments)	All Cost Effective BMP's in Existing MOU's Implemented by Current Signatories (present commitments)	All Cost Effective BMP's in Existing MOU's Implemented by Current Signatories (present commitments)	All Cost Effective BMP's in Existing MOU's Implemented by Current Signatories (present commitments)
Ag Water Use Efficiency	All Cost Effective EWMP's in Existing MOU's Implemented by Current Signatories (present commitments)	All Cost Effective EWMP's in Existing MOU's Implemented by Current Signatories (present commitments)	All Cost Effective EWMP's in Existing MOU's Implemented by Current Signatories (present commitments)	All Cost Effective EWMP's in Existing MOU's Implemented by Current Signatories (present commitments)
Per Capita Income	Current Trends	Current Trends	Current Trends	Current Trends
Seasonal/Permanent Crop Mix	Current Trends	Current Trends	Current Trends	Current Trends
Irrigated Land Retirement	Currently Planned	Currently Planned	Currently Planned	Currently Planned
Hydrology	Essentially a Repeat of History	Essentially a Repeat of History	Essentially a Repeat of History	Essentially a Repeat of History
Climate Change	Essentially a Repeat of History	Essentially a Repeat of History	Essentially a Repeat of History	Essentially a Repeat of History
Colorado River Supply	Equal to 4.4 Plan	Equal to 4.4 Plan	Equal to 4.4 Plan	Equal to 4.4 Plan
Existing Inter-Regional Import Projects	Current Conditions	Current Conditions	Current Conditions	Current Conditions
Flood Management	Current capacities, management practices and operations	Current capacities, management practices and operations	Current capacities, management practices and operations	Current capacities, management practices and operations
Energy Costs	As Projected From Current Trends	As Projected From Current Trends	As Projected From Current Trends	As Projected From Current Trends
Drinking Water Standards	Current and Planned	Current and Planned	Current and Planned	Current and Planned
Ag Discharge Requirements	Current and Planned	Current and Planned	Current and Planned	Current and Planned
Urban Runoff Mgmt.	Current Level of Use	Current Level of Use	Current Level of Use	Current Level of Use
Recreation	Present Demand Trends Continued	Present Demand Trends Continued	Present Demand Trends Continued	Present Demand Trends Continued
Desalting	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed
Recycled Water	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed
Water Transfers Within Regions	Currently Approved Transfers	Currently Approved Transfers	Currently Approved Transfers	Currently Approved Transfers
Water Transfers Between Regions	Currently Approved Transfers	Currently Approved Transfers	Currently Approved Transfers	Currently Approved Transfers
Integrated Ground & Surface Water Mgmt.	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed
Groundwater Storage	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed
Surface Water Storage	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed
Conveyance Facilities	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed	Current Level + Permitted/Financed
Rate Structure	Current Practices	Current Practices	Current Practices	Current Practices
Cost Recovery	Current Practices	Current Practices	Current Practices	Current Practices

(1) Water supplies shown in Table 1 represent a baseline for the year 2030.

(2) Naturally Occurring Conservation is the amount of background conservation occurring independent of the BMP and EWMP programs.

Scenario 1: Current Trends

Population and Land Use

- Population in 2030 is what the California Department of Finance has projected – 51.75 million people.[2]
- Increasing population pressure in the valley and on the California coast. Most people are moving to cities with large populations and high percentages of growth in Fresno, Stockton, Modesto, Bakersfield and San Diego.
- Expanding metropolitan areas continue to affect the residents' daily lives and agriculture.
- The cost of land in Southern California is growing—with shrinking availability.
- *Placeholder: add something on per capita income trends.*

Commercial and Industrial

- Industry has become more efficient in water use—driven to reduce costs in the face of competition. When possible, industries like concrete have moved to dry processing to eliminate water necessary to create its product—reducing costs.
- Businesses have been reducing water use over time because it is cost effective, primarily by replacing old or broken-down equipment with high efficiency machines.

Agriculture

- Irrigated agricultural land is about 7.75 million acres in 2030, a reduction of about 13 percent from 2000. Irrigated crop acreage, which includes multi-cropping, is about 8.52 million acres, a reduction of about 9.7 percent from 2000, and multi-cropping acreage increases by about 45 percent to 0.78 million acres from 2000
- Farmers are increasingly using sprinklers and drip irrigation, moving away from flooding and furrows. Farmers are able to turn irrigation on and off at will and decide exactly where to irrigate. Improved water management is modestly increasing water efficiency over 2000 levels. Irrigation techniques improve the uniform distribution of water to all plants, which is also contributing to an increase in plant size. Farmers produce more "crop per drop" through a variety of means, including changes in irrigation methods away from inefficient approaches, though more improvement is possible.
- A significant amount of the reduction in irrigated agricultural land is land with high quality soils. Any new land coming into production would be of poorer quality soils, decreasing some efficiency gains in applied water and yield per acre for those soils.
- Concerns about impacts to the local area from loss of farmland due to urbanization will continue to be addressed by local governments.

Environment

- Environmental flows would reach levels needed to meet the objectives of CALFED's Ecosystem Restoration Program and the objectives in the Anadromous Fisheries Restoration Program. Water

[2] CA Department of Finance projects Total California Population to be 45,821,900 in 2020 and 58,731,000 in 2040. For purposes of this report, assume 2030 projection = [(2040 projection) + (2030 projection)]/2 or about 51.75 million

dedicated to wetlands would reach the "Level 4" supplemental water supplies for National Wildlife Refuges cited in CVPIA Sections 3405 and 3406(b).

- Some increase in the extent of managed wetlands designed to use in cleansing wastewater due to projects which use floodplains/wetlands for high flow management and ecosystem restoration programs.
- In some areas, continued loss of functioning floodplains due to the direct encroachment of urban development (flash floods and fast runoff).
- In urban areas, where new development has ended, continued regional and local efforts to restore functioning channels and floodplains.
- Environmental effects of new projects continue to be mitigated, to some degree, but do not fully offset losses of habitat (with species effects) and other watershed impacts.

Groundwater

- Increase in groundwater remediation and aquifer quality protection.

Efficiency

- Urban Best Management Practices (BMPs) are commonplace in most water agencies, including residential indoor and outdoor water use surveys and improvements; commercial, industrial, and institutional water use audits and retrofits, landscape irrigation audits and upgrades; district water system leak detection and repair programs; metering, commercial washing machine rebate programs, conservation pricing, waste water reduction ordinances, and public information and education programs.
- Urban landscape irrigation has decreased, where irrigation does occur, fewer chemicals are applied.
- Existing efficiency standards affecting washing machines, toilets, spray valves in restaurants continue to be implemented.

Water Quality

- Water quality best management practices are limited to local affordability; limited public funding assistance is available.
- Current quality impairments continue in many waterways, particularly those which are not directly linked as urban drinking water sources.
- Urban stormwater runoff regulations (NPDES) are implemented, and point source controls continue to be implemented.
- Runoff from irrigated lands and lands used for grazing and timber harvest, nonpoint sources of water pollution, has moderately reduced.
- Some decrease in flexibility to meet Delta water quality standards, due to reduced surplus inflow and greater reuse of water upstream. Standards are assumed to be met.
- Substantial improvement in the effectiveness and affordability of water filtration technologies.

Water Demand

- Placeholder: Add in estimates for consumptive and applied water use for this scenario.

Considerations[3]

- Placeholder: CALFED ROD assumptions
- Funding for agricultural and urban water use efficiency programs.
- Implementation of agricultural and urban efficiency measures is part of overall management strategy, not just a response to drought conditions.
- Continued resistance by some water agencies to implement agricultural and urban water use efficiency best management practices.
- Urban sprawl has consumed valuable farmland, open space and other natural resources and contributed to water pollution, extinction of species, and increased competition for limited water resources.
- Construction of vast amount of impervious surfaces, such as roads and rooftops lead to degradation of water quality by increasing surface runoff, altering regular stream flow and watershed hydrology, reducing groundwater recharge, and increasing stream sedimentation.
- Sprawl in metropolitan areas, and negative economic impacts in some areas (where known) have environmental justice implications.
- Assumptions about the management of drainage impaired lands will affect irrigated agriculture and have implications for water supply and water quality.

Scenario 2: Resource Sustainability

Population and Land Use

- Population in 2030 is what the California Department of Finance has projected – 51.75 million people.[4]
- Citizens live in mixed use developments with native vegetation requiring little or no irrigation. An increase in population density means infill in existing urban areas and less new urban land being developed. This compact development has reduced the need for impervious surfaces benefiting open space, reduced runoff and other related issues.
- The cost of land in Southern California is growing—with shrinking availability.
- *Placeholder: add something on per capita income trends.*

Commercial and Industrial

- The industrial, commercial and agricultural sectors are strong, balanced with high environmental protection.
- Urban areas have a high degree of commercial and industrial productivity.
- California is a global leader in all types of recycling technology.
- California has emerged as a leading industrial producer of environmental products and continued as a force in producing hardware for the technology industry.

[3] Source: Chapter 5's management strategy narratives.
[4] CA Department of Finance projects Total California Population to be 45,821,900 in 2020 and 58,731,006 in 2040. For purposes of this report, assume 2030 projection = [(2040 projection) + (2030 projection)]/2 or about 51.75 million.

- Industry has shifted from water-intensive processing to dry product assembly, reducing water use. Businesses have dramatically reduced demand. They have received incentives accelerating the move to machines with high efficiency water use to accomplish standard tasks.

Agriculture

- Crop acreage levels out at the current year 2000 level or 9.44 millions acres.[5]
- Even with increasing urban densities, there will still be urbanization of agricultural land. Any land acreage removed from agricultural must be replaced by a combination of new land coming into production or an increase in multi-cropping, to keep the crop acreage at its current level of 9.44 million acres. The amount of land acreage and multi-cropping acreage would be quantified in Phase II.
- A viable agricultural sector has sustained export levels and food production in keeping with market forces and trends.
- The social contract continues to keep food and fiber prices low.
- A healthy, efficient agricultural sector has no new irrigated acres, but is able to produce more per acre and decrease applied water per irrigated crop acre.
- Farmers use sprinklers and drip irrigation on nearly all appropriate crops and lands. Flooding and furrow irrigation are applied only where more efficient methods cannot be used.. Farmers turn irrigation on and off at will and decide exactly where to irrigate based on accurate information on soil moisture and climate conditions. Improved water management is increasing water efficiency. Irrigation techniques improve the uniform distribution of water to all plants, which is also contributing to yields.

Environment

- Instream flows are sufficient to meet the objectives of CALFED's Ecosystem Restoration Program and the Anadromous Fisheries Restoration Program. In addition, flow objectives have been developed for streams statewide and those objectives are being met.
- Environmental health regulations are fully enforced, especially for air and water quality.
- Projects are designed to achieve multiple benefits integrating ecosystem restoration with water supply reliability
- River floodplain protection and restoration is undertaken for high flow management, habitat benefits, groundwater recharge, and public recreation (where appropriate).
- New developments and infrastructure (such as roads) are designed to minimize impacts to the natural drainage patterns and water quality of watersheds and increase groundwater recharge using urban water retention measures.
- Management actions are oriented toward the sustainability, restoration and improvement of the natural infrastructure.
- Californians recognize the link between the environment and their economic health and personal well being. Wetlands and native vegetation flourish through high environmental protection. Water dedicated to in stream use and enhancing aquatic life is finally yielding increased populations. The sense of the State and its policy is to sustain this high degree of environmental protection.

Groundwater

- There is increased utilization of existing groundwater aquifers to meet water demand and for water storage due to local cooperative watershed and integrated resource plans.
- Groundwater basins have been remediated and aquifer quality protection is in place.

Economics and Water Pricing

- Water has a high degree of economic optimization (e.g. $/drop) relative to existing economic activity types and water use efficiencies.
- Users are accustomed to paying more for water, especially in response to high levels of demand.
- The cost of investing in water use efficiency provides a return on investment.

Transfers and Conveyance

Infrastructure is built to permit local and regional water transfers in order to balance water supplies (but not large inter-regional transfers, especially those that must pump through the Delta)

Public Trust

- Water managers recognize public trust responsibilities to protect waters of the state for environmental, recreational, and aesthetic values.

Efficiency

- Naturally occurring conservation (NOC) trend is higher in the agricultural and urban sectors than under Scenario 1. Business and agriculture have recognized the benefits of conservation and implemented efficiency measures that go far beyond best management practices in place in 2000.
- Many houses are dual plumbed, enabling residents to use recycled water for appropriate uses.
- Municipal and agricultural best management practices become comprehensive, encouraging more water use efficiency improvements and practices to be developed.
- Native vegetation and other innovative landscaping techniques have greatly reduced residential demand for landscape irrigation.

Water Quality

- Water quality best management practices have been fully implemented.
- Implementation of urban stormwater runoff regulations (NPDES) and point source controls have exceeded anticipated levels.
- Runoff from irrigated lands and lands used for grazing and timber harvest, nonpoint sources of water pollution, has significantly reduced.
- Water quality in currently impaired lakes and rivers is substantially improved and clean waters are protected from degradation.

Water Demand

- Placeholder: Add in estimates for consumptive and applied water use for this scenario.

Considerations

- Placeholder: CALFED ROD assumptions
- Cost of implementation is a factor.

- Impact of climate change on hydrologies
- Funding for ag and urban water use efficiency programs
- Implementation of efficiency measures is part of overall management strategy, not just a response to drought conditions.
- Continued resistance by some water agencies to implement urban water use efficiency best management practices.
- Compact, mixed use development reduces water demand (landscaping) and minimizes pollution of surface and groundwater. Impacts to habitat, watershed functions, and groundwater recharge areas are reduced.

Scenario 3: Resource Intensive

Population and Land Use

- Population in 2030 is higher than what the California Department of Finance's projection of about 51.75 million.
- The population is dispersed regionally. Expanding urban areas are commonplace.
- Build-out for many cities and towns in Northern California and coastal regions hasn't been reached. More people live in the inland areas of the Central Valley and in the southern regions of California. Fresno, Stockton, Modesto, Bakersfield and San Diego have large populations and have experienced high percentages of growth.
- The population is more spread out resulting in more outdoor residential water use (e.g. larger residential lot size).
- The Central Valley is experiencing air and water quality problems due to the stress of the high population.
- People tend to drive individually long distances to the work place.
- Placeholder: add something on per capita income trends.

Commercial and Industrial

- The industrial, commercial and agricultural sectors are strong, balanced with existing environmental protection.
- Difficulty attracting clean, efficient industries has an impact on the state's attractiveness.
- California has become a global leader in recycling technology.
- California has emerged as a leading industrial producer of environmental products and continued as a force in producing hardware for the technology industry. California's leadership in high tech hardware places constraints on its water resources since this industry is a high water using industry that has not achieved advances in technology to limit its water use.
- Industry continues to rely on high water-using processes based on market conditions.

Agriculture

- Crop acreage levels out at the current year 2000 level or about 9.44 millions acres.[6]
- The healthy agricultural sector maintains past levels of food and fiber production. Low-density urban development expands onto prime farmland, but harvested acreage remains about the same due

to increased multi-cropping and new lands coming into production. The amount of land acreage and multi-cropping acreage would be quantified in Phase II.

- The annual volume of applied water per crop is high due to the changing nature of crops grown and the movement of agricultural production to lands with poor soil quality.
- There are no new long-term transfers of water from the agricultural sector to the cities.

Environment

(Note: The level at which these factors can be plausible under this scenario will need to be determined—May not be the same level as Scenario 2)

- To the extent possible, instream flows are sufficient to meet the objectives of CALFED's Ecosystem Restoration Program and the Anadromous Fisheries Restoration Program. In addition, flow objectives have been developed for streams statewide and those objectives are being met.
- Environmental health regulations are fully implemented, especially for air and water quality.
- Projects are designed to achieve multiple benefits integrating ecosystem restoration with water supply reliability
- River floodplain protection and restoration is undertaken for high flow management, habitat benefits, groundwater recharge, and public recreation (where appropriate).
- Californians recognize the link between the environment and their economic health and personal well being. Wetlands and native vegetation flourish through high environmental protection. Water dedicated to in stream use and enhancing aquatic life is finally yielding increased populations. The sense of the State and its policy is to sustain this high degree of environmental protection.

Groundwater

- Although some groundwater basins have been remediated and recharge protection is in place, groundwater overdraft is prevalent in the state and land subsidence occurs.

Economics and Water Pricing

- Water is used with a low degree of economic optimization (e.g. $/drop) relative to the economic activity types and efficiencies.

Efficiency

- (Naturally occurring) conservation in the agricultural and commercial and industrial sectors is lower than the current trends.

Quality

Water quality best management practices have been fully implemented but not extended.
Implementation of urban stormwater runoff regulations (NPDES) and point source controls have reached but not exceeded anticipated levels.
Runoff from irrigated lands and lands used for grazing and timber harvest, nonpoint sources of water pollution, has significantly reduced.
Improvements in water quality in impaired lakes from existing regulations are becoming more difficult to achieve.

Water Demand

- Water planners and decision makers have to contend with high water use in every sector.

- Water use is less efficient than in Scenario 2.
- Placeholder: Add in estimates for consumptive and applied water use for this scenario.

Considerations

- Placeholder: CALFED ROD assumptions
- Water quality has become a major challenge due to the increased demands and expanding urban areas.
- Water conveyance requires a great deal of infrastructure improvement due to the dispersed population.
- Expanding urban areas have consumed valuable farmland, open space and other natural resources and contributed to water pollution, extinction of species, and increased competition for limited water resources.
- Construction of vast amount of surfaces, such as roads and rooftops lead to degradation of water quality by increasing surface runoff, altering regular stream flow and watershed hydrology, reducing groundwater recharge, and increasing stream sedimentation.
- Urban water availability is constrained by high water use and limited transfers from agriculture.
- Water prices are much higher as scarcity increases.

Response Packages

T initial test response packages were developed to capture a range of management strategies. They should not be seen as what will be implemented but used as a basis for identifying short, medium, and long term recommendations A detailed work plan to be prepared during Phase 2 will identify specific options within each strategy for each of the response packages for future evaluation. This process will help identify data and analytical tools needed for each response package. It is recognized that qualitative approaches may be needed where there may not be sufficient data or adequate tools to quantify all costs or benefits.

It is important to note that under scenario planning, the evaluation is an iterative process where other response packages or ensembles can be developed by combining various strategies from each of the four response packages as results from the analytical work become known.

The following summarizes response packages that will be developed in Phase 2 of the work plan and evaluated in Phase 3. (See Section, Next Steps for Using Analytical Tools Including Short-term and Long-term Work Plan)

Response Package 1— Current Response Strategies

This package represents those strategies that most agencies are currently implementing. These strategies, packaged together, are being implemented by state, regional, and local organizations. They are technically and institutionally feasible, they make sense for the environment, they are economical, and do not raise significant equity issues.

Test Purpose: Recognizing that agencies can continue to implement those strategies that are supported by stakeholders, testing this response will determine how effective this package will be in meeting future water needs. The needs will be determined in Phase 2 for each of the alternative futures.

Goal: The goal of this package is to emphasize maximum implementation of current strategies supported by stakeholders.

Strategies: This response package would include options from strategies identified in this category that are widely supported by stakeholder groups. It consists of options that are proven effective, and are currently in use. The costs and benefits are generally known and can be quantified or acceptable qualitatively to justify implementation. This response package would also include options from strategies that stakeholders widely support but somewhat conditional based on the uncertainties of costs and benefits to justify implementation. An example would be the amount of urban water conservation that could be achieved using acceptable new technologies.

Discussion of Response Package 1 Strategies

Agricultural water use efficiency can benefit farmers by increasing net profit, reducing water applied, reducing groundwater overdraft, increasing yield, improving crop quality, improving districts ability to meet customer demands and reduce water losses, improving water quality, reducing drainage and surface runoff, increasing stream flows and improving temperature and timing, and potentially profiting from the sale of conserved water. Funding, implementation, education and motivation, innovation, dry year considerations, measurement, and planning and evaluation are obstacles to improvement. Farmers who implement efficiency measures not funded by the state incur costs.

Aquifer remediation to be added when narrative completed

Conjunctive management could increase average annual water deliveries and increase new storage through reoperation of existing groundwater storage and recharging water into currently empty groundwater storage space. It can stop land subsidence. Conjunctive management can improve water quality and benefit the environment when recharge basins are designed to be compatible with wildlife habitat.

Desalination to be added when narrative completed

Drinking water treatment and distribution can improve drinking water quality, which could directly improve the health of Californians, improve their standard of living and reduce the burden of costs associated with illnesses related to poor water quality.

Economic Incentives Policy to be added when narrative completed

Ecosystem restoration to be added when narrative completed

Matching water quality to use is an integral part of water management for agricultural and in-stream uses. Matching high quality source waters can reduce the levels of pollutants that cause health concerns in drinking water. Water agencies can experience improved treated water quality and supply reliability.

Pollution prevention can improve water quality for all beneficial uses by protecting water at its source. It can reduce non-point sources from urban and agricultural runoff and point source discharges. Pollution prevention approach to water quality is more cost-effective that end-of-the-pipe treatment of wastes.

Precipitation enhancement can increase water supply or hydroelectric power generation. Precipitation enhancement can increase costs of snow removal in mountain areas, and cloud seeding raises concerns about the long term toxic effects of silver, used for cloud seeding.

Recharge area protection can improve groundwater quality and ensure replenishment of groundwater supplies with good quality water ensuring a sustainable and usable water supply. Recharge area protection can limit development on recharge areas.

Recycled municipal water can provide additional reliable local sources of water for agriculture, reduce the discharge of pollutants to water bodies, provide a secure water supply during drought periods, and spare high quality potable water from irrigation.

Urban land use management can improve water quality by decreasing surface runoff, increasing groundwater recharge, decreasing stream sedimentation, and decreasing dangers of flooding by reducing impervious surfaces. Resource efficient development requires less water and minimizes pollution of surface water and groundwater. Compact, mixed-use development can reduce water demand with moderate increases in density.

Urban runoff management reduces nonpoint source water pollution and improves flood protection. Runoff management might also improve or increase water supply through groundwater recharge, groundwater quality, wildlife habitat, parks, and open space.

Urban water use efficiency lowers demand, offers the opportunity to cost-effectively stretch existing water supplies, and avoids cost of new supply construction. Urban water use efficiency can reduce amount of energy required to treat water.

Watershed management to be added when narrative is finished

Water transfers can increase flexibility in the water management system. Transfers can create controversy regarding the effects on water users, water quality, and fish and wildlife. Transfers raise issues regarding public trustee agencies' ability to monitor the implications to public trust responsibilities. Water transfers can result in third party costs that are difficult to quantify, such as increasing the salinity of groundwater. Because most transfers come from agriculture, transfers can negatively affect agricultural productivity and economic benefits although studies indicate that some transfers could occur as a result of crop idling without dramatically affecting local economies. Water transfers can provide economic benefits to sellers, but not necessarily to the whole area. Transfers can affect vulnerable populations who work in agricultural production. Transfers that increase groundwater pumping raise concerns over groundwater overdraft and the long-term sustainability of groundwater resources.

Working Lands Management (to be added when narrative is complete)

(Note: Each of the following packages will have a discussion of strategies section developed for Volume 1; detailed discussions can be reserved for the Reference Guide or the Work Plan developed during Phase 2)

Planning for Extreme and Prolonged Drought Conditions

Water managers today use hydrologic records of the past century to estimate how climatic conditions would affect future water availability and water needs. Planners take into account the normal fluctuations of wet and dry years in allocating deliveries from reservoirs and in determining how much water will be provided from other sources. Because the state has also experienced extreme and prolonged droughts, the most recent one occurring from 1987 to 1992, many local water agencies have developed drought contingency plans for such rare but extreme conditions that can result in significant socio economic and environmental impacts. The State has provided drought assistance to local water agencies and homeowners with the implementation of Proposition 50, Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002.

Since the last drought (1987-1992) following notable changes have occurred that would change the demand and supply. Population of California has increased by more than 6 million by year 2001 which will cause additional stress on the available water supply while completion of construction of Coastal Aqueduct (Department of Warer Resurces), Morongo basin pipelines (Mojave Water Agency), Diamond Valley Lake (Metropolitan Water district), Los Vaqueros Reservoir (Contra Costa Water District) and five large scale groundwater recharge/storage projects should add flexibility in operating the water system. Planers should take in to account these conditions when planning for another prolonged drought.

Historical Perspective

The most severe recorded drought occurred in 1976-1997. Two consecutive years with little precipitation (4th driest and the driest year in the recorded history) left California with record low storage in its surface reservoirs and groundwater levels dangerously lowered. Socio economic and environmental impacts were very severe during these extreme drought conditions. The total loss due to the drought during these two years exceeded $ 2.5 billion ($6.5 billion at today's cost).

The most recent prolonged drought lasted 6 years from 1987-1992. During the first 5 years of the drought, in San Joaquin valley the groundwater extractions exceeded the recharge by 11 million acre-feet which caused increased land subsidence in some areas. DWR studies indicate that in 1990-92, the drought resulted in reduced gross revenues of about $670 million to California agriculture. Energy utilities were forced to substitute hydroelectric power with more costly fossil-fuel generation at an estimated statewide cost of $500 million in 1991. The drought also adversely affected snow-related recreation businesses. Some studies suggest as much as an $85-million loss for snow-related recreation businesses during the winter of 1990-91.

Drought Contingency Planning

Several drought contingency planning reports are already published at state and regional levels, some of which as a result of legislature. Three bills enacted by the Legislature to improve water supply planning processes at the local level became effective January 1, 2002. In general, the new laws are intended to improve the assessment of water supplies during the local planning process before land use projects that depend on water are approved. The new laws require the verification of sufficient water supplies as a

condition for approving developments, and they compel urban water suppliers to provide more information on the reliability of groundwater if used as a supply. Normal and drought year conditions are specified in the law when evaluating water supply reliability.

SB 221 (Bus. and Prof. Code, § 11010 as amended; Gov. Code, § 65867.5 as amended; Gov. Code, §§ 66455.3 and 66473.7) prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project from the applicable water supplier(s). This requirement also applies to increases of 10 percent or more of service connections for public water systems with less than 500 service connections. The law defines criteria for determining "sufficient water supply, such as using normal, single-dry, and multiple-dry year hydrology and identifying the amount of water that the supplier can reasonably rely on to meet existing and future planned uses. Rights to extract additional groundwater must be substantiated if used for the project.

SB 610 (Water Code, §§ 10631, 10656, 10910, 10911, 10912, and 10915 as amended; Pub. Resources Code, § 21151.9 as amended) and AB 901 (Water Code, §§10610.2 and 10631 as amended; Water Code § 10634) make changes to the Urban Water Management Planning Act to require additional information in Urban Water Management Plans (UWMP) if groundwater is identified as a source available to the supplier. Required information includes a copy of any groundwater management plan adopted by the supplier, proof that the developer or agency has rights to the groundwater, a copy of the adjudication order or decree for adjudicated basins, and if not adjudicated, whether the basin has been identified as being overdrafted or projected to be overdrafted in the most current DWR publication on the basin. If the basin is in overdraft, the UWMP must include current efforts to eliminate any long-term overdraft. A key provision in SB 610requires that any project subject to the California Environmental Quality Act supplied with water from a public water system be provided a water supply assessment, except as specified in the law. AB 901 requires the plan to include information relating to the quality of existing sources of water available to an urban water supplier over given periods and include the manner in which water quality affects water management strategies and supply reliability.

California voters approved the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50; Water Code, § 79500 et seq.) in the November 2002 elections. The initiative provides for more than $3.4 billion of funding, subject to appropriation by the Legislature, for a number of land protection and water management activities. Several chapters of Proposition 50 allocate funds for specified water supply and water quality projects, including Chapter 3 Water Security. It provides $50 million to protect State, local and regional drinking water systems from terrorist attack or deliberate acts of destruction or degradation.

Local and Regional Efforts

The urban Water Management Act requires that each urban water agency which serves more than 3,000 people or 3,000 acre-feet per year, to prepare its own water management plan once in every five years. The urban water management plan includes an analysis and a contingency plan for water supply reliability in face of a severe drought which includes up to 50 percent reduction in water supply. Water management plans lay out shortage contingency scenarios that districts will use as guide lines when reducing demand and augmenting short term supply. Long and short term conservation measures,

recycling water, water transfers, short term sources of water, and long term storage including conjunctive use are some of the tools that water districts use to plan against a multi year drought

State Efforts

The Governor's Advisory Drought Planning Panel was formed in 2000 to develop a contingency plan to address the impacts of critical water shortages in California. The panel formed with the recognition that critical water shortages may severely impact the health, welfare, and economy of California. In its July 2000 report, "Preparing for California's Next Drought", the Department reviewed items for near-term drought planning, putting California's conditions today into perspective with experiences gained in the 1987-92 drought. Major findings of the report focused on the characterization of drought conditions as a gradual phenomenon and as a function of impacts on water users. The report also addressed the vulnerability of existing water users based on past droughts, and a discussion of current actions that affect drought preparedness planning.

As part of a five year planning program to implement specific actions of the CALFED Bay-Delta Program, a Governor's Drought Panel, in its December 2000 report, "The Critical Water Shortages Contingency Plan", made recommendations for actions that the State government could take to reduce the impacts of critical water shortages. The recommendations included a critical water shortage reduction marketing program to facilitate intra-regional, short term, and dry year transfers, financial and planning assistance to local agencies for drought-related response activities, and assistance to small water Systems and homeowners in rural counties. The work on these programs started early 2002 and is still ongoing through bond measures Proposition 13 (March 2000) and Proposition 50 (November 2002).

Governor's Advisory Drought Planning Panel (2000)

The CALFED Record of Decision (August 2000) called for the Governor to convene a Panel, chaired by the Director of DWR, to develop a contingency plan for reducing impacts of critical water shortages in the next several years while the actions identified in CALFED's Stage 1 were being planned and implemented. The Governor's Advisory Drought Planning Panel identified a variety of physical, regulatory, and institutional challenges to effective water management during times of critical water shortages.

The Panel intended the following recommendations to be statewide in scope, applying to any areas of the State that may benefit from them. Nothing in the recommendations is intended to limit their geographical scope to CALFED study areas. The Panel did not intend that its recommendations duplicate actions already scheduled for early implementation in the ROD, but rather suggests that ROD actions and the Panel's recommended actions be coordinated, as much as possible, to maximize their benefits.

A. Critical Water Shortage Reduction Marketing Program. The Panel recognized that the CALFED agencies were tasked with streamlining the water transfer process. In addition to the CALFED actions, the Panel recommended that DWR implement a Critical Water Shortage Reduction Marketing Program. The program would be operated as an as-needed water purchasing and allocation program using a three-tiered methodology. Tier 1 would consist of water shortage preparedness activities undertaken by State and local agencies. Tier 2 would consist of purchasing options and allocating water to communities that have maximized their own resources. Tier 3 would be implemented during a water shortage emergency and would include continued implementation of Tier 2 actions, plus extraordinary measures needed to protect public health and safety, such as State

financial assistance for water hauling, pipeline construction, or well drilling. DWR would acquire options to purchase water from willing sellers and would exercise the options as needed to make water available for sale to water users experiencing critical water shortages. The Panel further recommended that the Governor propose, and that the Legislature provide, a General Fund appropriation for preparing a programmatic EIR for Critical Water Shortage Reduction Marketing Program.

B. Assistance to Small Water Systems and Homeowners in Rural Counties. The Panel recommended that DWR develop a technical assistance and education program targeted at rural homeowners and small domestic water systems relying on self-supplied groundwater, to be implemented in consultation with rural county environmental health departments. The Panel further recommended that the Governor propose, and that the Legislature provide, an annual appropriation of at least $1.5 million from the State General Fund to support this program. The program would include workshops to educate homeowners; a website containing information on State and county well construction requirements, sources of groundwater level and well yield data; and requirements for informing potential home buyers of the groundwater and well conditions and risks.

C. Local Agency Groundwater Programs. The Panel recommended that DWR establish an AB 3030 technical assistance program, following the process established in Water Code Section 10795 et seq. The Panel further recommended that the Governor propose, and that the Legislature provide, an appropriation from the State General Fund of at least $5 million per year to implement the program. In addition, the Panel also recommended that the Governor propose, and that the Legislature provide, an appropriation of $1 million annually from the State General Fund to provide for ongoing statewide groundwater data collection and compilation (including geohydrologic and water quality data), and that DWR publish this information every five years as updates to Bulletin 118.

D. Local Agency Integrated Water Management Plans. The Panel recommended that DWR and other CALFED agencies work in partnership with local water agencies to assist them in developing plans to facilitate integrated management of supplies for agricultural, urban, and environmental purposes. The Panel further recommended that DWR provide financial assistance, in the amount of at least $2 million per year from a combination of General Fund, Proposition 204, or Proposition 13 monies to local agencies for preparing integrated water management plans.

E. Drought-Related Research and Public Outreach Activities. The Panel recommended that DWR identify and seek funding for research in the areas of long-range weather forecasting, global climate change, and paleoclimatology. The Panel recommended that DWR compile existing local agency drought watch indices and develop regional hydrologic drought indices for watersheds important to statewide water supply conditions and watersheds supporting significant urban and agricultural development. The Panel also recommended that DWR develop a public outreach program to stress the need for drought preparedness, building on the recommendations of the May 2000 report of the National Drought Policy Commission.

F. Accelerate Proposition 13 Financial Assistance to Local Agencies. The Panel urged the Governor to take all possible actions to ensure rapid disbursement of Proposition 13 funds, including out-of-State recruitment for new staff, statutory waiver of Water Code requirements for review of DWR rules and regulations by the California Water Commission, and expediting or statutory waiver of Office of Administrative Law review of rules and regulations. The Panel further recommended that bond monies applicable to CALFED actions be budgeted as quickly as possible, and that DWR maximize use of grants, rather than capitalization loans, to bring local agencies up to the base level of efficiency contemplated in the CALFED ROD.

DWR has implemented many individual actions aimed at meeting these recommendations. A few examples include:

Operated a dry year water purchasing program

- Held educational workshops for private well owners
- Convened the Small Water System Drought Preparedness Advisory Committee
- Conducted a competitive selection process for grants for preparation of groundwater management plans
- Installed production wells in the Klamath Basin
- Installed monitoring wells in Mendocino County
- Developed a drought preparedness web site
- Co-sponsored an academic conference on droughts

Responding to Future Droughts

In planning for future water supplies and needs, the hydrology of the past century may not be a reasonable measure of the climate in Northern California. The flow record available for California is rather short for determining hydrologic risks, extending back only about 100 years with mostly qualitative information perhaps for another 100 years. Past tree ring studies have shown extensive dry periods far exceeding the 6 year maximum that was recorded in the last century. For potential significant reductions to the Sierra snow pack from climate change as it may affect current hydrology is discussed under global climate change.

Planning Framework for Water Plan Update

In accordance and guided by the statutes of the Water Code, the Department of Water Resources (DWR) and an active 65-member advisory committee with input from a 320-member Extended Review Forum, prepared this water plan update by first developing a new planning framework to increase its utility and usefulness. The advisory committee is composed of representatives of agriculture, urban water districts, businesses, environmentalists, Native Americans, environmental justice advocates, cities, counties, federal and State agencies, the California Bay Delta Authority, academia, and different regions of the State.

DWR, the State department responsible for preparing water plan updates, and the advisory committee believe that the new framework is one of the significant accomplishments of this water plan update and should serve as the cornerstone for future updates because the framework (1) considerably expands public involvement and access to the State's water planning process; (2) seeks collaborative recommendations that are more robust, have greater longevity, and are more likely to be adopted by the Governor's Office, Legislature, and State, federal, and local agencies and governments, and resource managers; and (3) results in a strategic plan, which is a living document with stated goals, objectives, and implementation plan, including progress tracking, indicators and reports.

The new planning framework consists of:

- Collaborative planning process,
- Comprehensive way for describing current and future water supplies, uses and management (Water Portfolios with over 80 categories) using actual data (not trend-based) for recent yet different water year types, namely1998 (wet), 2000 (average), and 2001 (drier),
- Detailed reports on each of the regions of the State,
- Multiple scenarios for plausible futures (not a single "likely" future) to identify and minimize future uncertainties and risks, and
- Many diverse resource management strategies to meet future water demands while sustaining our resource base and economy.

The public review draft of the California Water Plan Update 2003 marks the end of the first of a three-phase work plan for completing update 2003 and beginning update 2008. Important elements of the new framework, notably future scenarios for regional planning and multiyear drought analysis, will be completed in subsequent phases in 2004 and 2005. DWR and the advisory committee developed the phased work plan to balance stakeholder interest to take the time required to implement the new framework with the need for the State to provide the next water plan update in a timely way. The phased work plan was needed because (1) DWR and the advisory committee want to more fully implement the new framework; (2) there is yet to be stakeholder agreement on the data, analytical tools, and methods that DWR will use to quantify and analyze multiple regional scenarios for 2030, including multiyear droughts and optional management responses; (3) DWR's schedule for conducting data analyses was delayed by the time needed to develop the new framework; and (4) DWR's budget and staff resources were reduced during this update cycle.

This update recognizes the vital importance of working with key stakeholders to define issues, identify potential approaches, and evaluate planning steps. Since January 2001 DWR and an advisory committee representing critical sectors with an interest in water management have worked to shape the new planning

framework and strategic planning process. Using large group meetings held roughly every six weeks for three years, more frequent smaller work groups and workshops, and many public briefings, DWR sought a broadly informed and consensus-seeking process. Advisory committee members provided the Department with substantial suggestions and recommendations on all aspects of the water plan update 2003.

Collaboration Statistics

Type of Meeting	Meetings	Person hours
Advisory committee	32	9,855
Workshops	32	2,260
Work groups	62	4,271
Extended review forum & organizational briefings	16	426
Tribal outreach	3	Pending
Totals	145	16,812

The role of the advisory committee was to provide diverse perspectives and to the fullest extent possible meet the interests of all Californians and the natural environment. The group was called upon to provide DWR with suggestions and conclusions on every aspect of the water plan update, including developing goals and strategies for water management in California.

The advisory committee strove to reach consensus on the purpose, content, and process of the water plan update. The support of the entire group was always initially sought; however, where time did not permit the resolution of all fundamental concerns with a proposal, the facilitation team captured the range of support and opposition to the proposal in its final wording. Information was then communicated to DWR for consideration and final decision. Those suggestions approaching consensus received the highest possible consideration for incorporation into the update.

As part of their membership obligations, advisory committee members periodically briefed their constituencies on key developments. Members relayed comments received during these briefings to DWR. The briefing process helped ensure two-way communication between members and their organizations. In addition, briefings formally expanded the dialogue beyond the precincts of the advisory committee meeting room into a wider audience of potential users of California Water Plan Update 2003.

To create a fair, open and transparent process, the California State University Sacramento, Center for Collaborative Policy (Center) provided impartial third party facilitation and mediation design, implementation, and refinement for the consensus-seeking process. The center ensured advisory committee members' interests, views, and opinions were thoughtfully considered and advisory committee activities were governed by its own operating guidelines.

In addition to the formal advisory body, an Extended Review Forum, composed of individuals with a high interest in the process attended periodic briefings and received invitations to advisory committee and work group meetings as well as updates on key developments. With more than 320 members, this group represents an even broader range of interests than the advisory committee. DWR also used other forums to engage other State, federal, and local government representatives, local water interests, the public, and

media. DWR periodically briefed the Governor's Office, Legislature, and the Resources Agency on the process.

The Internet provided another principal venue for advisory committee work. In its efforts to create an open and transparent public process, DWR used e-government technology to set up web pages and electronic surveys, and used email correspondence and teleconferencing whenever possible. DWR posted meeting agendas, materials, and highlights, including draft copies of California Water Plan Update 2003, for all to see. DWR also posted numerical data for the water portfolios and documentation on the web site for use by advisory committee members and other interested parties.

In line with the strategic planning process, DWR conducted a customer survey with people who may use the California Water Plan to ultimately make update 2003 widely understood and useful. The survey served to expand the audience of government, private, and nonprofit entities to include land use planners, natural resources planners, environmental and social advocacy groups, business sectors (for example, agricultural, real estate, financing), professional associations, academic institutions, water planners, wholesalers and retailers, and similar individuals and groups.

The survey indicates the planning horizon for most users is 2010. The issues of interests for evaluation parallel the advisory committee's, including water quality, cost, reliability, and environmental impacts. And major issues of concern are water quality, reliability, and land use planning.

In addition to the customer survey, the Center for Collaborative Policy conducted several stakeholder assessments with advisory committee members throughout the process. These served as feedback mechanisms for identifying issues for DWR to consider in the water plan update 2003, assessing staff progress for the work at hand, modifying meeting methods, and improving communication channels between DWR and the advisory committee and within the advisory committee.

The time taken to use a systemic approach for water planning is an investment. However, because of the current investment, future water plan updates won't have to start from scratch in setting up advisory committees, establishing protocols or reinventing planning approaches.